

PATENT ABSTRACTS OF JAPAN

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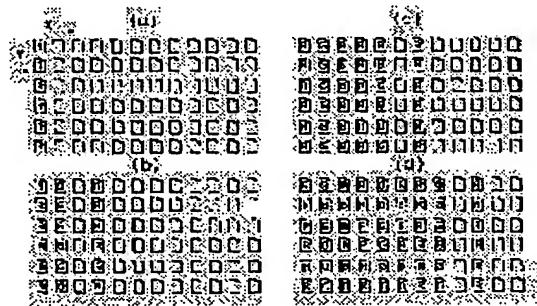
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(54) PRODUCTION OF COLOR FILTER

(57)Abstract:

PURPOSE: To control the color mixture of picture element material between adjacent picture elements and the fault of picture element density by sticking the picture element material to a transparent base plate while avoiding the simultaneous adhesion of adjacent parts in either directions X and Y.

CONSTITUTION: In the case of sticking an ink drop to the transparent base plate, the ink drop of red R is stuck in the 1st column in the direction Y as shown by figure (a). Next, the ink drop of green G and the ink drop of red R are simultaneously stuck in the 2nd column and the 4th column in the direction Y while avoiding the adjacent parts in the direction X as shown by figure (b). Then, the ink drops of blue B, green G and red R are simultaneously stuck in the 3rd column, the 5th column and the 7th column in the direction Y while avoiding the adjacent parts in the direction X as shown by figure (c). Furthermore, the ink drops of blue B, green G and red R are simultaneously stuck in the 6th column, the 8th column, and the 10th column in the direction Y while avoiding the adjacent parts in the direction X as shown by figure (d). In the same manner, the ink drops of blue B, green G and red R are stuck in the direction Y, so that the picture elements of blue B, green G and red R are formed in a matrix state on the surface of the transparent base plate.



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CLAIMS

[Claim(s)]

[Claim 1] The manufacture approach of the light filter characterized by avoiding simultaneous adhesion of the part which is the manufacture approach of a light filter of making a pixel ingredient adhering in the direction of X and the direction of Y in order of a predetermined array at a transparency substrate, and adjoins either [at least] said direction of X or the direction of Y in said pixel ingredient, and making it adhere to said transparency substrate.

[Claim 2] The manufacture approach of the light filter of claim 1 of heating said transparency substrate before adhesion of said pixel ingredient at least.

[Claim 3] The manufacture approach of of the claim 1 or the light filter of 2 which makes said pixel ingredient adhere to said transparency substrate with either the ink jet method, print processes or an electrodeposition process.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the manufacture approach of a light filter.

[0002]

[Description of the Prior Art] When carrying out color display on a liquid crystal panel, the light filter which carried out patterning of red, green, and each blue pixel ingredient on the transparency substrate at predetermined array sequence is used. And that by which the light filter formed the black matrix, the coloring layer, the protective coat, and the transparent electrode on the glass substrate is a general configuration.

[0003] In the pixel formation in such a light filter, although various approaches, such as the staining technique and pigment-content powder method using the photolithography method, the ink jet method, print processes, and an electrodeposition process, are used, the small thing of the unit of the field of the improvement in image quality in the display screen to a pixel (coloring layer) is desirable. However, the constraint on the technique used for pixel formation etc. to a pixel is about 60x240 micrometers in very detailed magnitude. For this reason, on the occasion of manufacture of a light filter, precision needs to improve a pixel ingredient patterning to many pixel patterns.

[0004] In order to be accurate and to carry out patterning of the pixel ingredient for a short time, it is the approach that the ink jet method, print processes, or an electrodeposition process is desirable, for example, the manufacture approach of the light filter by the ink jet method is indicated by JP,59-75205,A.

[0005]

[Problem(s) to be Solved by the Invention] By the way, the approach indicated by the above-mentioned official report had the problem which a pixel ingredient is mixed between the adjoining pixels, a pixel ingredient inclines at one side in the case of color mixture and the same color, and becomes poor [pixel concentration] like the case of print processes or an electrodeposition process in the case of a patterning process when it is the color from which this differs.

[0006] This invention was made in view of the above-mentioned point, and aims at offering the color mixture of the pixel ingredient between the pixels which adjoin in the case of a patterning process, and the manufacture approach of the light filter which can control poor pixel concentration.

[0007]

[Means for Solving the Problem] In order to attain the above-mentioned object according to this invention, it is the manufacture approach of a light filter of making a pixel ingredient adhering in the direction of X, and the direction of Y to a transparency substrate in order of a predetermined array, and considered as the configuration which avoids simultaneous adhesion of the part which adjoins either [at least] said direction of X or the direction of Y in said pixel ingredient, and is made to adhere to said transparency substrate.

[0008] Preferably, said transparency substrate is heated before adhesion of said pixel ingredient at least. Moreover, said pixel ingredient is made to adhere to said transparency substrate with either the ink jet method, print processes or an electrodeposition process preferably.

[0009]

[Function] If simultaneous adhesion of the part which adjoins either [at least] the direction of X or the direction of Y in a pixel ingredient is avoided and it is made to adhere on a transparency substrate, the solvent of the pixel ingredient made to already adhere by the time it made the following pixel ingredient adhere will evaporate, and a pixel ingredient will not be mixed between the adjoining pixels. If said transparency substrate is heated before adhesion of said pixel ingredient at least at this time, evaporation of the solvent in an ink droplet will be promoted.

[0010] Moreover, if said pixel ingredient is made to adhere to said transparency substrate with either the ink jet method, print processes or an electrodeposition process, a pixel ingredient will be accurate and patterning will be carried out for a short time.

[0011]

[Example] Hereafter, the manufacture approach of the light filter by the ink jet method is explained to a detail based on drawing 1 thru/or drawing 3 as one example of this invention. Drawing 1 is a schematic diagram explaining the principle of the ink jet method. A piezoelectric device 1 disunites the ink which the regurgitation nozzle 2 is vibrated and is breathed out continuously, and let it be an ink droplet (pixel ingredient). The electrification electrode 3 gives a predetermined charge to the ink droplet passed with the pulse voltage impressed based on a printing information signal. On the other hand, with the deflecting electrode 4 of a lot, a flight path is deflected according to electrification level, and the ink droplet to which the charge was given with the electrification electrode 3 adheres to the location of a request of the transparency substrate 5. Moreover, the ink droplets which did not adhere to the transparency substrate 5 are collected in a gutter 6.

[0012] Therefore, make the ink droplet of each color of red, green, and blue breathe out from each regurgitation nozzle 2, and a light filter makes it adhere in the direction of X and the direction of Y of the transparency substrate 5 in order of a predetermined array, and after performing each processing of a temporary cure and book cure etc. and considering as a pixel, it is manufactured through the process which forms a protective coat, a transparent electrode, etc. The manufacture approach of the light filter in this invention has the description to avoid the part which adjoins either [at least] the direction of X, or the direction of Y on the occasion of adhesion of the above-mentioned ink droplet, and make it adhere to the transparency substrate 5.

[0013] That is, in case the above-mentioned ink droplet is made to adhere to the transparency substrate 5, a red (R) ink droplet is made to adhere to eye the 1st train in the direction of Y first, in this invention approach, as shown in drawing 2 (a). Here, the longwise square shown in drawing 2 (a) – drawing 2 (d) is a part which is divided by the black matrix formed in the shape of a grid on the transparency substrate 5, and it adheres to an ink droplet, and serves as a pixel.

[0014] Next, as shown in drawing 2 (b), the part which adjoins in the direction of X is avoided, and the ink droplet of red (R) ** is made to adhere in the direction of Y to eye the 2nd train simultaneously at green (G) and eye the 4th train, respectively. Subsequently, as shown in drawing 2 (c), the part which adjoins in the direction of X is avoided, and the ink droplet of red (R) ** is made to adhere [blue (B) and eye the 5th train] in the direction of Y to eye the 3rd train simultaneously at green (G) and eye the 7th train, respectively.

[0015] Furthermore, as shown in drawing 2 (d), the part which adjoins in the direction of X is avoided, and the ink droplet of red (R) ** is made to adhere [blue (B) and eye the 8th train] in the direction of Y to eye the 6th train simultaneously at green (G) and eye the 10th train, respectively. the following — the same — carrying out — blue (B) — green — if the ink droplet of (G) and red (R) is made to adhere in the direction of Y, respectively — the transparency substrate 5 — a front face — blue (B) — green — the pixel of (G) and red (R) is formed in the shape of a matrix.

[0016] As mentioned above, it faces making a pixel ingredient adhere to two or more pixel locations simultaneously, and the adjoining part is avoided. If three regurgitation nozzles 2 which carry out the regurgitation of the ink droplet of blue (B), green (G), and red (R) at this time are arranged every other pixel in the direction of X in order that they may avoid the part which adjoins in the direction of X and

may make the ink droplet of each color adhere, they can make the ink droplet of each color adhere efficiently, and can shorten the processing time.

[0017] Moreover, as for the ink droplet adhering to the location corresponding to each pixel of the transparency substrate 5, in the case of water color ink, water evaporates in about 1.5 – 2 seconds. For this reason, in this invention approach, if the part which adjoins either [at least] the direction of X or the direction of Y is avoided and an ink droplet is made to adhere, when preventing the color mixture of the ink droplet between the adjoining pixels, it is enough. However, when a hot plate is used, and a transparency substrate is heated from the lower part before adhesion of said ink droplet at least or it heats with the means of irradiating with a heat lamp, evaporation of solvents, such as water in an ink droplet, is promoted, and it is further effective when preventing color mixture with the ink droplet to which the part which adjoins either [at least] the direction of X or the direction of Y successively adheres.

[0018] Moreover, as long as this invention approach avoids the part which adjoins either [at least] the direction of X, or the direction of Y and can adhere an ink droplet to the transparency substrate 5, it may avoid the part which adjoins in the direction of Y, and the direction of Y, and may make an ink droplet adhere to the transparency substrate 5, as it is not limited in the above-mentioned case and shown in drawing 3 (a) – drawing 3 (d). That is, while making the part corresponding to 1 picture element which consists of blue (B), green (G), and red (R) adhere in the direction of Y every other line first as shown in drawing 3 (a), avoid the part which adjoins in the direction of X, it is made to adhere, and the pixel of up to the 6th train from [the 1st train] is adhered alternately. After adhering the picture element of the 1st line at this time, if adhesion of the picture element of the 2nd line is stopped, processing speed will fall. For this reason, in the case of this example, the 2nd line deflects a discharge direction so that it may be made to adhere to the part which adjoins by 1 picture element.

[0019] Next, as shown in drawing 3 (b), an ink droplet is similarly adhered to the part corresponding to 1 picture element from the 7th line to the 12th line with eye the 1st train to eye the 6th train.

Subsequently, an ink droplet is made to adhere for every picture element of the part which remained [the 6th train] from eye the 1st train, and blue (B), green (G), and red (R) are made to adhere to the transparency substrate 5 in the shape of a matrix, as are shown in drawing 3 (c), and shown in drawing 3 (d).

[0020] here — setting — this example — blue (B) — green — although the ink droplet of (G) and three red (R) colors was made to adhere in the shape of a matrix, things which can be made to adhere to versatility, such as the shape of the shape of a mosaic or a triangle, cannot be overemphasized.

Moreover, although the above-mentioned example explained the manufacture approach of the light filter by the ink jet method, it cannot be overemphasized as a means to make a pixel ingredient adhere to a transparency substrate that print processes and the electrodeposition process other than the above can be used.

[0021]

[Effect of the Invention] The property of the light filter which according to the manufacture approach of the light filter of this invention the color mixture and poor pixel concentration of a pixel ingredient between the pixels which adjoin in the case of the patterning process of the pixel ingredient to a transparency substrate are controlled, and is obtained so that clearly improves at the above explanation, and the color display when using it for a liquid crystal panel becomes good.

[0022] Since a transparency substrate is heated before adhesion of a pixel ingredient at least at this time, as a result of promoting evaporation of the solvent in an ink droplet, the color mixture of the pixel ingredient between the adjoining pixels can control further. Moreover, since a pixel ingredient is made to adhere to a transparency substrate with either the ink jet method, print processes or an electrodeposition process, it is accurate and patterning of the pixel ingredient can be carried out for a short time.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is a schematic diagram explaining the principle of the ink jet method used by the manufacture approach of the light filter of this invention.

[Drawing 2] It is the explanatory view showing the adhesion procedure of the pixel ingredient to the transparency substrate in this invention approach.

[Drawing 3] It is the explanatory view showing other adhesion procedures of the pixel ingredient to the transparency substrate in this invention approach.

[Description of Notations]

1 Piezoelectric Device

2 Regurgitation Nozzle

3 Electrification Electrode

4 Deflecting Electrode

5 Transparency Substrate

6 Gutter

[Translation done.]